Primary Objective
Develop a pathway for treating asthma that directs patient care from the Emergency Room through inpatient management to discharge.

Recommendations
1. Provide standardized dosing for Short Acting Beta Agonists (SABA), Anticholinergic Bronchodilators (ie Ipratropium Bromide), and Steroids.
2. Provide guidelines for when and how patients should be assessed during an asthma exacerbation.
3. Establish classes of severity and therapeutic interventions based on those classes.
4. Establish admission and discharge criteria.
5. Reduce unnecessary testing not routinely recommended for evaluation of an asthma exacerbation.

Rationale (Safety, Quality, Cost, Delivery, Engagement, & Satisfaction)
- **Safety:** Will be maintained by close communication between the ED providers, RNs, and Inpatient providers, especially when a patient is categorized as severe.
- **Quality:** Will be improved by instituting consistent terminology, dosing, and care between providers.
  - A pathway will also reinforce that all Children’s providers deliver care based on the NHLBI guidelines and send a consistent message to patient, families, and outside providers.
  - “Multidisciplinary clinical pathways for asthma appear to be effective in reducing hospital length of stay and inpatient costs” (NHLBI p385; Banasiak and Meadows-Oliver 2004).
- **Cost:** Will be reduced by decreasing hospitalization rates and reducing time spent in the ED prior to admission.
  - We will reduce length of stay by providing steroids early and having set criteria for advancing patients on their treatments.
- **Delivery:** Will be improved by expediting patient flow through the Emergency Department to the Inpatient floor for providers, RNs and RTs.
  - RN administration of oral steroids after triage and use of double dosing of Ipratropium Bromide (IB) with triple dosing of albuterol has been shown to reduce hospitalization rates and length of time spent in the ED.
  - Provider assessment within one hour after initial inhaled treatment is also anticipated to reduce length of time spent in the ED.
  - Developing discharge criteria may reduce length of stay in the hospital.
  - Education will be incorporated throughout the patient’s stay and will be consistent. We will teach families how to follow an Asthma Action Plan and how to use an MDI with spacer.
Asthma Pathway Committee
Executive Summary

• **Engagement:** Is created and supported by the involvement of a multidisciplinary team in the development and maintenance of the pathway, which includes MDs, RTs, RNs, and pharmacy staff.
  o As the pathway expands, it is anticipated that there will be a role for social workers and case managers to also become involved.

• **Patient/Family Satisfaction:** Shall be improved by providing the highest quality care based on established guidelines and the latest evidence available in the literature.
  o It is anticipated that the number of return visits to the ED will be reduced by institution of this pathway. This will increase family, as well as Primary Care Provider, satisfaction.
  o Staff satisfaction will be addressed through a survey before and after the initiation of the pathway so we may continue to improve our communication between departments.

**Implementation Items**
- ED and Inpatient Algorithms
- ED and Inpatient Order Sets
- Asthma Pathway Training Module for ED nurses
- Asthma Pathway Training Session for RTs
- Asthma Pathway Training for residents
- Asthma Pathway Introduction Grand Rounds
- Staff Satisfaction Survey
- Asthma History Tool for admission
- M-PACT Screening Tool for the ED
- Stepwise Approach to Managing Asthma
- Asthma, Allergy & Pulmonology Referral List

**Metrics Plan**
- To assess medical staff satisfaction with asthma care at Children’s before and after implementation of the pathway via survey.
- To examine the effect of the quality and efficiency of care in the ED before and after the implementation of the pathway through an IRB approved research protocol.

**APC Plan**
- To continue to meet every 1-2 months through the first year of implementation of the pathway to monitor our effectiveness in teaching the pathway, utilizing it, and adapting it to our hospital.
- After the first year, we anticipate developing the pathway further to include recommendations for Asthma Action Plans and bridging patients better from the point of care at Children’s back to their medical home.
Asthma Pathway Committee  
Executive Summary  

Evidence  

General  

Role of Clinical Care Pathways  

Continuous Albuterol  

**Ipratropium Bromide**

**Corticosteroids**

**Magnesium Sulfate**
Controllers
25. “Key Points for Asthma Guideline Implementation” from the Medical Home Chapter Champions Program on Asthma; 2013.

Other Institutional Pathways
27. Asthma Clinical Care Guideline for Children’s Hospital/Kaiser/Denver Health, 2009
28. University of Rochester Medical Center Pediatric Asthma Clinical Care Pathway 4/1/13
29. Seattle Children’s Asthma 3.0 Executive Summary 12/7/12
The Asthma Clinical Care Pathway

Inclusion Criteria
1. Children 2 years and older who present to the Emergency Department (ED) or are directly admitted to the inpatient floor with a primary problem of asthma exacerbation.
2. Children 1-2 years of age may also be included, after evaluation by an attending physician, as long as they do not fit any exclusion criteria.

Exclusion Criteria
1. Children with a chronic pulmonary or cardiac condition other than asthma (such as Bronchopulmonary Dysplasia/Chronic Lung Disease, Cystic Fibrosis, Airway anomalies) or who have a neuromuscular disorder.
2. Children currently being treated for bronchiolitis, viral pneumonitis, aspiration pneumonia, or croup.

Definitions
- Patients will be divided into “Mild,” “Moderate,” and “Severe” categories, similar to the NHLBI guidelines. We have developed a pathway that will expedite treatment and standardize our assessments. Patients will be placed in one of the above categories based on their Clinical Respiratory Score and Provider assessment.
- “Mild” patients will be defined as those who have a CRS $\leq 4$ which equates to a child who has a few of the following: retractions in less than 2 muscle groups, good to fair air entry, mild or only expiratory wheeze, may have mild hypoxia and a mild elevation in respiratory rate.
- “Moderate” patient will be defined as CRS 5-7, which equates to a child who has all of the above symptoms $\pm$ a few more severe symptoms: retractions in 2 muscle groups, fair to diminished air entry, full expiratory wheeze and may have some inspiratory wheeze, is likely hypoxic, and may be anxious.
- “Severe” patients will be defined as CRS $\geq 8$, which describes a child who is clearly in distress and needs immediate attention. This child has all of the moderate symptoms described above and may have a few more severe symptoms, such as lethargy, intercostal retractions, absent air entry or inspiratory and expiratory wheezes in all lung fields.
- Respiratory Therapists (and Nurses in the ED) will assess patients and assign their CRS scores. A patient can be initially placed on a higher position on the pathway if the provider (i.e. physician) believes that the patient is more ill than their CRS implies, or if they are borderline on their score. The Asthma Pathway Committee will keep track of patients who are treated this way in order to have on-going assessments of our CRS system and how our RTs are assessing patients. If there is
still a discrepancy between the provider and RT assessment at the time of the second treatment, then the patient will need to be taken off the pathway and can be treated as the provider chooses.

**ED Pathway** (Refer to Algorithm 1)

**Objectives:**
- Early identification of asthma exacerbations by triage nurses and respiratory therapists
- Nurse-initiated, CRS-driven pathway with standardized treatments with timely assessments
- Utilize consistent dosing and treatment frequency
- Provide guidelines for use of steroids early in the ED course
- Provide guidelines for admission to either the inpatient floor, IMC, or PICU
- Initiate a pathway of treatment that will follow the patient through their stay (except for the PICU), that will also convey a consistent message of how we treat asthma to nursing, RT, inpatient and outpatient providers, and especially to patients and their families

**Intake:**
- We will follow the NHLBI guidelines for asthma exacerbations, including immediate initiation of treatment (steroids and SABA) for those having a moderate, severe, or life-threatening exacerbation based on a brief history and physical assessment.
- Triage nurses will perform the brief history and physical exam and inform RT and the ED provider when there is a patient with a severe exacerbation.
- The Brief History
  - Identify that patient has a history of asthma, “reactive airway disease,” or more than two prior episodes of cough/wheeze that have been responsive to albuterol.
  - Time of onset and potential triggers for current exacerbation
  - Severity of symptoms (and comparison to prior exacerbations) and response to any treatments given prior to arrival
  - Current medications and time of last dose
  - Estimated number of office visits, ED visits and hospitalizations for asthma symptoms, especially in last year
  - Prior episodes of respiratory insufficiency (altered consciousness, PICU admissions, intubations)
  - Potential complicating illnesses: other pulmonary or cardiac disease, or illnesses aggravated by steroids (diabetes, peptic ulcer, hypertension or psychosis)
- The Brief Physical Exam
  - Assess the Clinical Respiratory Score, including level of consciousness, presence of cyanosis, and respiratory distress.
  - Perform quick assessment of fluid status and patient’s ability to tolerate oral medications.
Asthma Pathway Committee
Executive Summary

- Identify possible complications (pneumonia, pneumothorax, or pneumomediastinum).
- Rule out upper airway obstruction. If the child is between 1 and 2 years of age, assess for signs of bronchiolitis and discuss with provider.

- A more detailed history and physical exam will follow after initial therapy has been completed. Laboratory and/or imaging studies are not required for these patients, but will be considered after the initial therapy has been completed and will not delay initiation of treatment.
- For children who are mild-moderate and old enough to perform objective lung function testing will have a PEF performed on arrival and 30-60 minutes after the initial treatment.

Treatment:
- Initial treatment will include an SABA (for all patients), two doses of IB (for moderate-severe patients), and systemic corticosteroids for most. Oxygen will be provided for patients with SpO2 ≤ 90%.
- RT will provide respiratory treatments; nursing will be trained on how to give these treatments if RT is delayed or unavailable.
- Our goal is to have nursing provide the first steroid dose immediately after the patient has been triaged and at the start of their first inhaled treatment for all moderate-severe patients. Mild patients may require systemic steroids, especially if they have incomplete response to a SABA in the ED.
- Adding multiple doses (2-3) of IB to a selective SABA produces additional bronchodilation, resulting in fewer hospitalizations, in the ED setting (Evidence A from the NHLBI guidelines. Plotnick and Ducharme 2000; Rodrigo and Castro-Rodriguez 2005; Qureshi 1997; Qureshi 1998; Schuh 1995; Zorc 1999). We have selected a double dose based on Qureshi 1998. The combination of 3 doses of albuterol with 2 doses of ipratropium bromide may be referred to as a “Unineb.”
- For severe patients, adjunctive magnesium sulfate (with a normal saline bolus) will be considered.
- Repetitive administration of SABAs produces incremental bronchodilation. By providing these three doses as part of a large nebulized treatment, we will insure that patients receive those doses in a timely manner and make our RTs available to treat more patients. As 60-70% of patients have sufficient response to this type of initial treatment to be discharged, we will make this standard therapy for any patient presenting with a moderate-severe exacerbation and reassess their response one hour after treatment (NHLBI p393).
- All patients who receive a “Unineb” will be re-assessed within 60 minutes of the completion of their treatment. Response to this initial treatment has been shown to be a better predictor of the need for hospitalization than the initial presentation (Evidence A, NHLBI guidelines p396; Kelly et al. 2004). If patients have had good response and are “mild,” they will be discharged unless they continue to be hypoxic.
or have a concurrent issue necessitating admission. If the patient remains moderate-severe, they will be continued on scheduled albuterol according to their severity level and be admitted to the appropriate location (see Pathway Algorithm).

- Serial pulse oximetry measurements will be assessed to help determine response to therapy and need for admission along with clinical improvement and CRS. An initial spot pulse oximetry is useful for assessing exacerbation severity, but not for predicting need for hospitalization (Keahey et al 2002; Kelly et al 2004; Keogh et al 2001; Sole et al 1999, Wright et al 1997; NHLBI guidelines p.379). A repeat pulse oximetry of <92% 60 minutes after initial therapy is a better predictor (Kelly et al. 2004; Sole et al. 1999; Wright et al. 1997; NHLBI guidelines p.379).

- We will attempt to make admit decisions within 4 hours based on the patient's reassessment and need for repeat albuterol after their steroid dose and initial SABA (± IB) treatment (see Pathway Algorithm).

- Studies have shown that initiating an ICS at ED discharge can have a significant reduction in the risk of subsequent ED visits or relapse events (Sin and Man 2002; Rowe et al. 1999). Patients who are not on long-term control therapy will be evaluated for whether it is indicated by utilizing the M-PACT screening tool. Patients who may benefit from an ICS will be requested to follow with their PCP or be referred to either Pulmonology or an Allergy & Asthma group for further evaluation. (ref: M-PACT Study and referral list). ED provider may also consider prescribing a 1-2 month supply of an ICS at discharge to bridge the gap to primary care. All patients discharged from the ED will be asked to follow with the their PCP within 5-7 days and a Pulmonologist or Asthma & Allergy specialist in 1-4 weeks if indicated.

- Patient and family education will be performed with RT prior to discharge, which will include how to use an MDI with spacer and possibly a peak flow meter.

**Dosing:**

- Dosage recommendations for Albuterol are 0.15mg/kg (min dose 2.5mg) every 20 mins x 3 doses. We will combine these three doses into a larger nebulized dose and combine with ipratropium bromide:
  - 2.5mg x 3 = 7.5mg for children <10kg
  - 5mg x 3 = 15mg for children ≥10kg

- Thereafter patients will be switched to 4-8 puffs via MDI with spacer, unless they require continuous albuterol or difficulty handling MDI administration. This will reinforce that MDIs are equally effective to nebulized treatments and allow RT to begin MDI teaching.

- Ipratropium Bromide dosing is recommended as 0.25-0.5mg every 20 minutes for 3 doses and may be mixed with albuterol in the same nebulizer. We will combine two doses of IB with the 3 doses of albuterol as follows:
  - 0.25mg x 2 = 0.5mg for children <10kg
  - 0.5mg x 2 = 1mg for children ≥10kg
Asthma Pathway Committee
Executive Summary

- We will continue to follow the recommendations for 1-2mg of Prednisone (max = 60mg/day) by starting with a 2mg/kg “burst” in the ED. There is no known advantage to intravenous administration over oral therapy, therefore we will provide oral Prednisone unless the patient is working too hard to swallow the medication or is vomiting (NHLBI p387).

Inpatient Pathway (Refer to Algorithm 2)

Objectives:
- Provide expedient care to direct admissions that are consistent with ED practices when patients arrive from a primary care office or Urgent Care setting.
- Provide continuity of care from the Children’s Emergency Department
- Routinely assess patients and advance their treatment when the patient is improving, regardless of time of day.
- Enhance communication between RTs, RNs, and MDs.
- Develop a complete Asthma History Tool to provide consistent and thorough evaluation of a patient’s asthma and allergy history at the time of admission.

Admission:
- Upon arrival on the floor, the patient will be assessed by a physician and a respiratory therapist. The RT will assign a CRS and the Physician Team will select which protocol to start the patient on: “Severe,” “Moderate,” or “Mild.” RTs will continue treatments scheduled from the ED until a pathway is selected and then will follow the Inpatient Pathway once ordered (See Algorithm 2).
- The Physician Team will use the EPIC order sets to place where a patient begins on the pathway. If the team does not want to use the dosing or schedule built in to pathway, then the patient will not be placed on the pathway and the order set should not be used.
- All patients will have a full Asthma history obtained on admission using the Asthma History Tool. Based on the patient’s history, all patients will be evaluated as to whether they are on a proper controller medication.
- RTs and the physician team will continue to assess patients based on they place in the pathway. When a patient is deemed ready to advance on the pathway, the RT will inform the physician team who will be expected to assess the patient and advance their orders in a timely fashion (within 30-60 minutes).
- If a patient is not responding to their treatments, the physician team should be notified by RT and/or nursing. Adjunctive therapy should be considered, or the patient should be escalated on the pathway. Patients who are not responsive and are “severe” will be considered for transfer to the PICU if they are have worsening mental status, increasing oxygen requirements, or not responsive to adjuvant therapy.
- Throughout the patient’s hospital stay, RT will work on asthma teaching with the family, including how to effectively use an MDI with a spacer. At discharge, an
Asthma Action Plan will be created for all patients by the physician team and taught to the family by RT.

**Dosing:**
- Will be consistent with what is provided in the ED and within NHLBI guidelines.
- Atrovent will be available as adjuvant therapy for severe patients for the first 24 hours as 250mcg via neb Q4 hours.
- Albuterol will be given either continuously, Q2hrs or Q4hrs based on the patient’s place on the pathway. Albuterol will be given via MDI unless the patient is on continuous or not tolerating MDI treatments (i.e. anxious toddler who is more calm with nebulizers). Dosing will be based on weight below or above 10kg:
  - <10kg:
    - Mild: 4 puffs Q4 hours
    - Moderate: 4 puffs Q2hours
    - Severe: 0.5mg/kg/hr Continuous
  - ≥ 10kg:
    - Mild: 8 puffs Q4 hours
    - Moderate: 8 puffs Q2 hours
    - Severe: 0.5mg/kg/hr Continuous
- Prior to discharge, the patient will be reduced to home dosing of Albuterol (2-4 puffs) and assessed 4-6 hours later to insure they tolerate the lower dose.
Algorithm 1

**Asthma Pathway Committee**

**Executive Summary**

**Algorithm 1**

**Asthma Pathway**

**Emergency Department Management**

**Identify Asthma Exacerbation**

- Recent cough/wheeze in known or suspected asthma ≥ 2 yr
- Vital Signs
  - FiO2 ≥ 96%, place on O2
  - Weight (kg)
  - Assign CRS
- Order ED Asthma order set
- Notify RT
- Notify provider if Severe

**Possible Diagnostic Testing**

- Routine testing NOT recommended.
  - CXR, consider if asymmetric.
  - RV/P, consider if in acute illness.
  - CBC
  - CPK
  - BMP

**Mild CRS <4**

- Meds: Give Albuterol MDI based on pt weight
- Consider Prednisone
- Assessment: Reassign post-treatment CRS
- Initiate Asthma Education

**Moderate CRS 5-7**

- Meds: Give PO Pred (unless recent contact)
- Start weight based UNINEB
- Assessment: Reassign post-treatment CRS
- Notify MD when severe complex

**Severe CRS ≥8**

- Meds: Give PO Prednisone, consider IV Meds/preparations if too SOB or PO or recent demise
- Consider IV placement
- Start weight based UNINEB
- Assessment: Reassign post-treatment CRS
- Nursing to notify provider when severe complex
- Provider to re-evaluate within 1 hour of UNINEB

**If Mild**

- Meds to consider:
  - Around the clock Albuterol Q15 for 24-48 hours
  - Oral steroids
- Assessment: Provider to re-evaluate within 2 hours of treatment
  - Admit if FiO2 remains < 90% or if patient may need treatment sooner than Q15
  - Complete M-PACT; consider referral to Pulmonology
  - Recommended follow-up within 3-7 days

**If Moderate**

- Meds: Start Albuterol MDI q2h with q1h PRN
- Assessment: Admit if still Moderate after first 2 h Albuterol tx or SpO2 remains < 90%
  - Consider further diagnostic testing

**Indications For Considering PICU**

- Worsening WOB after UNINEB
- FO2 ≥ 60%
- No response to MgSO4
- Previous history of intubation/ICU
- Declining mental status

**If Severe**

- Meds: Place IV and start fluids
  - Consider Methylprednisolone
  - Place on Continuous Albuterol at ≥40% FO2
  - Consider Magnesium Sulfate with Normal Saline bolus

- Assessment: Consider further diagnostic testing
  - Provider to re-evaluate 1 h after start of Continuous Albuterol

- Admit to IMC or Continuous Albuterol and IVF (unless qualifies for PICU)

*Asthma EG Protocol: 09/02/2014*

*This protocol may be used for 1-2 year olds at the discretion of a physician.*
Algorithm 2

Asthma Pathway Committee
Executive Summary

ASHTMA PATHWAY
Inpatient Management

IDENTIFY ASTHMA EXACERBATION
*Recurrent cough/wheeze in known/suspected asthmatic ≥2yr
  - Assign CRS
  - Order Asthma Inpatient Pathway
  - Initiate Asthma Teaching

SEVERE CRS ≥8
Admit to IMC status
Medications
- Continuous Albuterol
- Consider Atrovent Q4h
- Consider IV steroids
- NPO
- Start/continue IVF
Assessment
- CRS and RT assessment Q1h
- Physician assessment Q3h
- Advance to Moderate pathway when assessed as Moderate x 2

MODERATE CRS 5-7
Admit to Med-Surg Standard
Medications
- Albuterol MDI Q2“ with Q1“ PRN
- Discontinue Atrovent
- Discontinue IV steroids
- Start PO Prednisone x 3-10 days
- Reassess PO IV status
Assessment
- CRS and RT assessment Q1“ x 4, then Q2“ and PRN
- Physician assessment 1“ post Continuous Albuterol and PRN
- Advance to Mild pathway when assessed as Mild x 2 and 
  effO2

MILD CRS ≤4
Admit to Med-Surg Standard
Medications
- Albuterol MDI Q4“ with Q2“ PRN
- Start/continue PO Prednisone
- Advance to home dose when ready for discharge

DISCHARGE
- Continue Albuterol at home dose of 2 puffs Q4-6 for 1-2 days
- Complete Asthma Education and Asthma Action Plan
- Schedule PCP follow-up in 2-7 days
- Consider Pulmonary or Asthma Allergy follow-up
- Update PCP

Possible Diagnostic Testing
- CXR, consider if atopic
- RVP, consider in flu season or
  for mycoplasma
- CRC
- CBG
- BMP

Indications for considering PICU
- Worsening WOB or
  Continuous Albuterol
- EC02 >60%
- No response to MgSO4 (up to 2 doses)
- Previous history of ETT/PICU
- Declining mental status

Indications for considering Pain or AI Referral
- Patient on a combination
  inhaled controller
- Severe atopy (combination of
  allergies, eczema and asthma)
- Recent ED visits or
  hospitalizations

*This protocol may be used for 1-2 year olds at the discretion of a physician.
Asthma History Tool

**Current Presentation:**
Date/Time of symptom Onset: ***
Symptoms Included: [***] Cough [***] Wheezing [***] Shortness of Breath [***] Fever
Treatments Given at Home: ***

ED Course: ***

**Asthma History**
Prior Diagnosis of Asthma: ***
Last Course of Steroids: ***
Number of Courses of Steroids in Past Year: ***
ED/PCP Visits for Asthma in Past Year: ***
Asthma Admissions in Past Year: ***
Ever in ICU or Intubated: ***

**Asthma Medications**
Asthma Rescue Medications: ***
Actual Use of Albuterol (more than 2x/wk, 1-2x/wk, Only with Exercise): ***
Asthma Controller Medications: ***
Actual Use of Controller: ***
Allergy Medications: ***
Asthma Action Plan at home? ***

**Triggers/Symptoms**
Use Peak Flow Measurements at Home: ***
Triggers: ***
Environmental History (smokers, pets, mold, rodents): ***
How often do the following symptoms occur? (2x/month, <2x/wk, >2x/wk, daily, always)
Daytime cough/wheeze: ***
Nighttime cough/wheeze: ***
Cough/wheeze with activity: ***
Allergy symptoms: ***

Who Provides your asthma care (PCP or specialist): ***

Severity Classification (place an X in front):
- Intermittent
- Mild Persistent
- Moderate Persistent
- Severe Persistent
M-PACT Screening Tool for the ED

Mini Pediatric Asthma Control Tool (M-PACT)

Please take time to fill out this checklist. This checklist can help doctors and nurses (and you!) to know how to best help your child manage his or her asthma.

- Children may have different signs of asthma.
- Signs of asthma get worse during an asthma flare (also known as an attack or exacerbation)

What are the signs of asthma for your child? (check all that apply)

- Coughs
- Gets mucus in his or her chest
- Feels chest pain or tightness
- Whooshes (a whistling in the chest)
- Gets short of breath
- Breathes fast

Think about the past 3 months

- How often did these things happen when your child was feeling his or her best and not having an asthma flare? (check one)

1. Asthma symptoms with running or sports

2. Asthma symptoms while asleep at night

3. He or she needed to take albuterol or other quick-relief medicine for asthma symptoms

Responses in the shaded area above indicate the presence of persistent asthma symptoms

*Adapted from Sampayo et al. 2010.
### Executive Summary

Asthma Pathway Committee

#### Stepwise Approach for Managing Asthma

**Table 1: Stepwise approach to managing asthma**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Preferred treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>SABA pmt</td>
</tr>
<tr>
<td>Step 2</td>
<td>Low dose ICS</td>
</tr>
<tr>
<td>Step 3</td>
<td>0-4 years: Medium dose ICS (CS = sub-specialist referral) ≥ 5 years: Low dose ICS + LABA or low dose ICS</td>
</tr>
<tr>
<td>Step 4</td>
<td>Medium dose ICS + LABA or montelukast + sub-specialist referral</td>
</tr>
<tr>
<td>Step 5</td>
<td>High dose ICS + LABA or montelukast + OCS = sub-specialist referral</td>
</tr>
<tr>
<td>Step 6</td>
<td>High dose ICS + LABA or montelukast + OCS = sub-specialist referral</td>
</tr>
</tbody>
</table>

**Notes**
- *Adapted from “Key Points for Asthma Guideline Implementation”*
- When step up, review adherence, inhaler technique, environmental control and controlled conditions.
- If clear benefit is not observed within 4-6 weeks and/or technique is incorrect, consider adjusting therapy and/or alternative diagnosis.
- Emergency department

**Table 2: Classifying asthma severity and initiating therapy**

<table>
<thead>
<tr>
<th>Components of severity</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>≤ 2 days/week</td>
<td>&gt; 2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>0 (≥ 4 years)</td>
<td>1-2/night (≥ 6 years)</td>
</tr>
<tr>
<td>SABA use for symptoms</td>
<td>≤ 2 tablets/day</td>
<td>&gt; 2 tablets/day</td>
</tr>
<tr>
<td>Limitation of normal activity</td>
<td>None</td>
<td>Minor</td>
</tr>
<tr>
<td>Long function *</td>
<td>FEV1 &gt; 80%</td>
<td>FEV1/FVC &lt; 85% (5-11 years)</td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring ICS</td>
<td>0-1/year</td>
</tr>
</tbody>
</table>

**Recommended step for initiating therapy *****

- Step 1
- Step 2
- Step 3
- Step 4 or 5 (≥ 11 years)

**Table 3: Assessing asthma control and adjusting therapy**

<table>
<thead>
<tr>
<th>Components of control</th>
<th>Well controlled</th>
<th>Not well controlled</th>
<th>Very poorly controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>≤ 2 days/week</td>
<td>&gt; 2 days/week (if ≤ 11 years)</td>
<td>&gt; 2 days/week (if &gt; 11 years)</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤ 2/night (if ≤ 12 years)</td>
<td>3-4/night (if &gt; 12 years)</td>
<td>5-6/night (if &gt; 12 years)</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Some irritation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>SABA use for symptoms</td>
<td>≤ 2 tablets/day</td>
<td>&gt; 2 tablets/day</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Lung function *</td>
<td>FEV1 &gt; 80%</td>
<td>FEV1/FVC &lt; 85% (5-11 years)</td>
<td>FEV1/FVC &lt; 85% (12-18 years)</td>
</tr>
<tr>
<td>Exacerbations requiring ICS</td>
<td>0-1/year</td>
<td>≥ 2/year (if ≤ 11 years)</td>
<td>≥ 3/year (if &gt; 11 years)</td>
</tr>
<tr>
<td>Risk</td>
<td>Reduction in lung growth</td>
<td>Requires long-term follow-up</td>
<td>Treatment related to adverse effects</td>
</tr>
</tbody>
</table>

**Recommended action for treatment ******

- Consider step down if well controlled for ≥ 3 months.
- Step up 2 steps.
- Re-evaluate in 2-6 weeks.

**Adapted from “Key Points for Asthma Guideline Implementation”**

---

* Some individuals with milder forms are on ICS without a clear need for the maintenance therapy, and some may not respond to ICS. Evaluation for alternative causes, including atopy, should be considered.

* For 0-4 years, low-dose ICS therapy is recommended for persistent asthma.

* For severe asthma, the use of ICS and LABA at the time of the exacerbation should be considered.

*** For initial therapy of milder forms of asthma, the following recommendations are provided: Consider a trial of ICS for mild persistent asthma.

**** For patients with ICS-refractory asthma, consider referral to a specialist in asthma.
Asthma, Allergy & Pulmonology Referral List

Your child may benefit from use of an inhaled controller for his/her asthma based on our screening today in the Children’s Hospital & Medical Center Emergency Department. Please discuss with your primary care provider, or you may seek specialty care with one of the following providers:

**Children’s Hospital Asthma, Allergy & Pulmonology Clinic**
8200 Dodge Street
Omaha, NE 68114

**Midwest Allergy & Asthma**
16945 Frances Street
Omaha, NE 68130
P: 402-397-7400  F: 402-397-0115

**Boys Town Allergy, Asthma & Pediatric Pulmonary Clinics**
1. **Boys Town Medical Campus – Pacific Street Clinic**
   14080 Bows Town Hospital Road (139th & Pacific)
   Boys Town, NE 68010
2. **Lakeside Pediatric Clinic**
   16929 Frances Street, Suite 101
   Omaha, NE 68130
   P: 402-758-5125  F: 402-758-5283
3. **88th Street Pediatric Clinic**
   2801 South 88th Street
   Omaha, NE 68124

**Allergy, Asthma & Immunology Associates, P.C.**
1. **Omaha Clinic**
   2808 South 80th Ave, Suite 210
   Omaha, NE 68124
2. **Lincoln Clinic**
   600 North Cotner, Suite 208
   Lincoln, NE 68505
Asthma Pathway Committee
Executive Summary

Team Members
Dr. Lauren Maskin, Rachel Shirk, RT, Britnee Hallett, RT, Kendra Christensen, RT, Dr. Tom Deegan, Trish Lade, RN, Kristi Kult RN, Dr. Luke Noronha, Dr. Casey Burg, Dr. Betsy Stephenson